Rev Quant Finan Acc (2016) 46:881–905
DOI 10.1007/s11156-014-0490-0

ORIGINAL RESEARCH

CFO gender and earnings management: evidence from China

Yu Liu · Zuobao Wei · Feixue Xie

Published online: 8 January 2015

Abstract We study the effect of chief financial officer (CFO) gender on earnings management (EM) in China's listed firms from 1999 to 2011. In the cross-sectional analysis, we find that female CFO firm-years exhibit significantly lower discretionary accruals, lower total accruals, lower abnormal production costs, and higher abnormal discretionary expenditures, than the male CFO firm-years. We further examine the relation between CFO gender and EM surrounding CFO transitions. We find that the departing male CFOs are more aggressive than the departing female CFOs in managing *up* earnings during their last year with the firm and the newly appointed male CFOs are more aggressive than the new female CFOs in managing *down* earnings during their first year on the job. The evidence surrounding CFO transitions suggests that male CFOs are more aggressive than female CFOs in manipulating earnings, either in the last attempt to save their jobs or to take bigger credit for any future performance gains. Overall, our empirical evidence suggests that female CFOs engage in less EM and are more conservative in financial reporting than their male counterparts.

Keywords CFO · Gender · Earnings management · Accounting conservatism · China

JEL Classification G30 · G32 · M41

Women can hold up half of the sky.
-Mao Tse-tung.

Y. Liu · Z. Wei · F. Xie (✉)
Department of Economics and Finance, University of Texas at El Paso, El Paso, TX, USA
e-mail: fxie@utep.edu

Y. Liu
e-mail: yliu4@utep.edu

Z. Wei
e-mail: zwei@utep.edu

1 Introduction

This paper studies the relation between chief financial officer (CFO) gender and earnings management (EM) in China's publicly traded companies. The motivations are three folds: (1) Scores of Chinese companies listed in the US have been accused of accounting frauds and the ensuing investigations by the Securities and Exchange Commission (SEC) are still ongoing; (2) Recent studies in accounting and finance show that a CFO has the most direct impact on a firm's financial reporting and EM decisions (Mian 2001; Feng et al. 2010; Jiang et al. 2010; Ge et al. 2011); and (3) A large number of studies have shown that in general, women are more risk averse and conservative than men in making financial decisions.[1]

Over the last few years, the US SEC has audited scores of Chinese firms listed in US amid concerns of accounting frauds. By the end of 2012, the SEC had delisted 50 Chinese companies from US stock exchanges and launched fraud investigations against more than 40 Chinese firms and their executives.[2] The implications for the parties involved are tremendous. First, this ongoing saga has gone beyond accounting standards and become an international issue between the US and China. Over the past 3 years, the SEC and the Public Company Accounting Oversight Board (PCAOB) have been negotiating, without success, with their Chinese counterpart, the Chinese Security Regulatory Commission (CSRC) in an attempt to gain access to the audit papers of the Chinese companies under investigation. The Chinese auditors argue that Chinese laws prohibit them from complying with the SEC requests. The SEC sued the accounting firms directly in the US court and won the case.[3] Second, the US investors have lost billions of dollars for investing in the now delisted firms and could lose billions more if the issue is not resolved. However, the biggest losers will be the private Chinese firms seeking investor capital. Since China's state-owned banks focus mainly on lending to large state-owned enterprises (Allen et al. 2005), small and financially constrained private firms that are the sources of most innovations are likely to suffer.

Two recent headlines capture the essence of the story: "There's no accounting for China's accounting" and "Chinese companies could face delisting from the US exchanges".[4] Clearly, earnings quality of Chinese publicly traded companies is of interest to regulators, investors, as well as capital seeking businesses. It should also be of interest to scholars.

Barua et al. (2010) examine the earnings quality in relation to CFO gender in the US firms. They find that firms with female CFOs are associated with higher quality of accruals than firms with male CFOs. They infer that female CFOs are more conservative than male CFOs in financial reporting. Our study complements Barua et al. (2010) in two aspects. First, the US and China rank the largest and the second largest economies in the world, respectively. Yet the two countries are very different in many aspects. For instance,

[1] See Arch (1993); Byrnes et al. (1999); Barber and Odean (2001); Barua et al. (2010); Huang and Kisgen (2013), among others.

[2] Source: "U.S., China in Cold War over Accounting Rules," *Bloomberg Business Week*, December 4, 2012 issue.

[3] Source: www.reuters.com, 1/23/2014. On January 23, 2014, a judge in the United States ruled that the Chinese units of the "Big Four" accounting firms should be suspended from auditing U.S. listed Chinese firms for 6 months. Failure to resolve the issue in six months could result in the SEC banning Chinese accounting firms from auditing U.S. listed Chinese companies, which could lead to more delisting of the accused companies.

[4] Source: *Wall Street Journal,* 5/29/2013 and *China Daily*, 7/10/2013, respectively.

China's law and institution, including corporate governance, accounting standards, and quality of government are significantly less developed or weaker than those in developed countries (Allen et al. 2005). Empirical evidence shows that EM in firms located in countries with strong governance is less pronounced than EM in countries with weak governance (Leuz et al. 2003). This suggests that corporate executives such as CFOs may behave differently under different institutional environments. We examine whether the documented relation between CFO gender and EM exists in China, given the aforementioned institutional differences between the US and China.

Second, our study employs a much larger sample that consists of 11,644 firm-year observations over a longer time period (1999–2011).[5] Our sample allows us to identify a CFO's tenure and to observe a large number of CFO transitions which is needed when we examine the relation between CFO gender and EM around CFO turnovers. One feature of our sample worth noting is the high average fraction of female CFOs (28 %), compared to that in the US firms.[6] In addition, as a result of Chinese government's policies that strongly promote women's social and economic status in the society over the last few decades, China's corporate sector has more top female managers than many developed economies.[7] Studies with a focus on executive gender and corporate decisions, such as this study, add another layer of relevancy in the case of China.

In the empirical analysis of EM behavior by CFO gender in the Chinese listed firms, we first conduct cross-sectional analysis on the difference in EM between female CFO firm-years and male CFO firm-years. We find that female CFO firm-years exhibit significantly lower discretionary accruals, lower total accruals, lower abnormal production costs, and higher discretionary expenses than male CFO firm-years.

We then examine the relation between CFO gender and EM surrounding CFO transitions. We find that the departing male CFOs are more aggressive than the departing female CFOs in managing *up* earnings during their last year with the firm, possibly in an attempt to save their jobs or to obtain bigger severance or retirement packages. We also find that the newly appointed male CFOs are more aggressive than the newly appointed female CFOs in managing *down* earnings during their first year on the job, possibly in an attempt to take bigger credit for any subsequent performance improvements.

Our study contributes to the existing literature on executive gender and corporate decision making by adding timely empirical evidence from China, the world's largest developing economy. With findings from the two biggest economies in the world, one with highly developed and the other with severely underdeveloped institutions and governance, one can argue that female CFOs are more conservative in making financial reporting decisions, regardless the institutional and business environments within which they operate.

The rest of the paper is organized as follows. Section 2 focuses on pertinent research and hypotheses development. Section 3 describes the sample and EM measures. While Sect. 4 presents empirical results of the cross-sectional analysis, Sect. 5 examines gender and EM surrounding CFO transitions. Section 6 concludes the paper.

[5] Barua et al. (2010) examine a sample of 2,781 firm-year observations over a two-year period (2004–2005).

[6] Firms with female CFOs constitute 8 % (8.7 %) of sample in 2004 (2005) in Barua et al. (2010). Huang and Kisgen (2013) document that female CFOs account for 3.0 % in 1994 and 7.5 % in 2005 in major U.S. corporations.

[7] According to Grant Thornton International Business Report 2007, approximately eight out of ten public companies in China have women in the senior management roles, compared to a half in the European Union and two-thirds in the U.S. About 31 % of top corporate executives are female in China, compared to 20 % in the U.S.

2 Related literature and hypothesis development

In this section, we start with a brief review of prior research related to gender, risk preference, corporate finance and accounting conservatism. We then discuss EM and develop a set of hypotheses related to CFO gender and EM.

2.1 Gender, risk preference, corporate finance and accounting conservatism

It is widely accepted in the literature that men and women have different risk perceptions due to the inherent genetic difference and that women are more risk averse than men. A large volume of literature further shows that gender affects personal investment choices that reflect risk preference. For instance, Hinz et al. (1997) analyze data from a 1990 Survey of Participants of the Federal Thrift Savings Plan and find that women invest their pension contributions more conservatively than men. Bajtelsmit and van Derhei (1997) study individual pension asset allocations and find that women are more likely to invest in fixed-income securities than men. Similarly, Sunden and Surette (1998) examine asset allocations of defined contribution plans using data from the Survey of Consumer Finances. They find that females and married couples are more conservative in allocation of risky assets. In a more recent study, Cesarini et al. (2010) match individual portfolio selection decisions in Sweden with the Swedish Twin Registry and find that approximately 25 % of individual variation in portfolio risk is due to genetic variation.

A few recent studies focus on gender and corporate finance. For instance, Adams and Ferreira (2009) examine how board gender diversity affects firm performance and corporate governance. They find that adding more female directors to the board has a negative effect on performance and that chief executive officer (CEO) turnover is more sensitive to stock performance if the board is more gender-diverse. On the contrary, Liu et al. (2014) show that firms with more females on boards perform better than firms with fewer females on boards in the Chinese listed firms. Huang and Kisgen (2013) examine the impact of gender of top executives (CEOs and CFOs) on corporate decisions surrounding top executive transitions in the U.S. They find that relative to their male counterparts, female top executives issue less debt and engage in fewer mergers and acquisitions. Their findings suggest that female top executives are more conservative and less overconfident in making significant corporate decisions.

There is a growing number of studies that focus specifically on financial reporting decisions and accounting conservatism (Basu 1997; Ahmed et al. 2002; Watts 2003a, b; Ahmed and Duellman 2007, among others). However, very few examine the gender effect on accounting conservatism (Francis et al. 2014). Accounting conservatism is a financial reporting approach that many firms use to limit the amount of risk in their accounting information and to avoid misleading stakeholders regarding the firm's financial health. It is often viewed as requiring higher verification standards for recognizing a gain than a loss (Basu 1997; Watts 2003a, b). This cautious approach anticipates lower profits along with higher losses. As a result, it can lead to delayed gain recognition and accelerated loss recognition. Hence more risk-averse executives (such as female CFOs) are likely to use more conservative accounting practices than overconfident or less risk-averse executives (such as male CFOs). For example, Li and Hung (2013) find that overconfident mangers are more likely to engage in earning management behaviors. By examining EM around the CFO transitions, Francis et al. (2014) shows that female CFOs tend to adopt more conservative financial reporting policies. Barua et al. (2010) find that female CFOs are related to higher quality of accruals than their male counterparts. Their interpretation is that female CFOs are

more cautious and less aggressive in making judgments related to discretionary accruals. The findings in the aforementioned studies suggest that gender of top executives has a significant impact on a firm's financial reporting decisions as well as on firm performance.

2.2 Earnings management and hypotheses

2.2.1 Hypothesis on accruals-based earnings management

Earnings management can occur through two channels: accruals-based management and real activities-based management. Healy and Wahlen (1999) define (accruals-based) EM as follows:

> "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." (p. 368)

There is an extensive literature in accounting and finance examining managers' incentives and actions to manage earnings in the United Sates,[8] though only few focus on EM in listed firms in China. For instance, Aharony et al. (2000) examines the earnings patterns of initial public offering (IPO) firms in China and find that Chinese state-owned firms engage in "financial packaging" 2 years before selling shares to foreign investors. Chen and Yuan (2004) and Yu et al. (2006) find that China's seasoned equity offering (SEO) firms engage in EM in order to meet the regulatory thresholds for SEO. More recent studies examine whether management demography, cross-listing, or media exposure influences accruals-based EM behaviors and whether EM affects the IPO anomalies (Cheng and Leung 2012; Eng and Lin 2012; Qi et al. 2014; Shen et al. 2014).

However, accruals-based earnings manipulations are likely to draw auditors' attention or regulatory scrutiny, and entail a risk to managers who engage in those activities (Roychowdhury 2006). Given that corporate decisions also reflect mangers' personal risk preferences, one would expect that the accounting practices such as financial reporting of female executives be more conservative. We hence expect that female CFOs engage less in accruals-based earnings manipulation. To capture accruals-based EM we use total accruals as well as discretionary current accruals (DCAC) estimated from the modified cross-section Jones model (Jones 1991) as described in Dechow et al. (1995).[9] We present our first hypothesis (in alternative form) as follows:

H1 Female CFO firm-years exhibit lower discretionary current accruals and lower total accruals than male CFO firm-years do, ceteris paribus.

2.2.2 Hypotheses on real activities-based earnings management

More recently, researchers have started to pay more attention to how firms manage earnings through real activities manipulations.[10] While accruals-based manipulations

[8] See, Healy and Whalen (1999); Fields et al. (2001), and Kothari (2001), among others.

[9] Please see the "Accruals-based measures" section in Appendix 1 for the description and estimation of our accruals-based earnings management measures.

[10] See, Graham et al. (2005); Roychowdhury (2006); Gunny (2009), and Zang (2011), among others.

generally do not involve altering operations and bear no direct cash flow consequences, real activities-based manipulations affect operating cash flow. Roychowdhury (2006) defines real activities manipulation as

> "departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations." (p. 337)

Roychowdhury (2006) examines three real activities manipulation methods that can be used to avoid reporting losses: sales manipulation, reduction in discretionary expenditures and overproduction.[11] Discretionary expenses, such as advertising expense, maintenance, R&D, and SG&A expenses, are generally expensed in the same period in which they occur. Hence firms can report higher current period earnings by intentionally reducing such expenses. Roychowdhury (2006) argues that if the management intentionally manages current earnings upward, discretionary expenditures would be lower than normal level of expenditures, which could also lead to higher current period cash flows.

On the other hand, managers can increase production more than necessary in order to increase earnings. As argued in Roychowdhury (2006) higher levels of production help spread fixed overhead costs over a larger number of units, thus reducing fixed cost per unit. As long as the reduction in fixed costs per unit is not offset by any increase in marginal cost per unit, total cost per unit declines, which leads to lower cost of goods sold and increased operating margins. However, overproduction would cause unusually high current period production costs relative to sales, leading to lower cash flows from operations.

The net effect of real activities manipulation on a firm's operating cash flow may be ambiguous. However, if a firm's management intends to manage up current period earnings through real activities manipulations, its discretionary expenditures should be unusually low and its production costs unusually high. To capture real EM, we estimate abnormal production costs and abnormal discretionary expenses as in Roychowdhury (2006).[12]

One may argue that the chief operating officer is more directly responsible for production and sales decisions. However, the responsibilities of a CFO in a contemporary corporation extend beyond financial reporting and oversight. As pointed out in Mian (2001), a CFO has significant influence on major corporate decisions, including working capital management, capital budgeting and capital structure decisions. If female CFOs are more conservative in making operational decisions, one would observe less real EM activities among female CFOs than among male CFOs. We hence propose the real activities-based EM hypotheses as follows:

H2a Female CFO firm-years exhibit lower abnormal production costs than male CFO firm-years do, ceteris paribus.

H2b Female CFO firm-years exhibit higher abnormal discretionary expenditures than male CFO firm-years do, ceteris paribus.

[11] Our results do not show a significant difference between male and female CFOs in sales manipulation, we hence do not focus on this measure of EM in our study.

[12] Please see the "Real activities-based measures" section in Appendix 1 for the description and estimation of our real activities-based earnings management measures.

2.2.3 Earnings management hypotheses surrounding CFO transitions

Motivated by Geiger and North (2006) who examine accruals management surrounding CFO turnovers in the US listed firms, we examine the relation between CFO gender and EM surrounding CFO transitions in the Chinese listed firms. Geiger and North (2006) find that the departing CFOs manage up earnings in year $(t - 1)$, where t is the year of CFO transition, in an attempt to save their jobs or to get a better retirement package. They also find that the newly appointed CFOs intentionally manage down earnings in year $(t + 1)$ in order to take bigger credit for any performance improvement in the subsequent years.

We build on Geiger and North (2006) by adding CFO gender into the equation. We examine the relation between CFO gender and EM in year $(t - 1)$ and in year $(t + 1)$. Based on our prior discussion on gender, risk preference and EM, we argue that if the departing CFOs are male, earnings manipulation in year $(t - 1)$ would be more pronounced than in cases where the departing CFOs are female. Similarly, if the newly appointed CFOs are male, earnings manipulation in year $(t + 1)$ would also be more pronounced than in cases where the newly appointed CFOs are female. We employ DCAC and abnormal discretionary expenditures in our examination of EM surrounding CFO transitions because manipulations of discretionary items are relatively easy and more likely to produce immediate results (Geiger and North 2006). Table 1 illustrates the expected EM by the departing CFOs at $(t - 1)$ in Panel A and by the succeeding CFOs at $(t + 1)$ in Panel B.

More specifically, the departing CFOs manage up earnings at $(t - 1)$. As shown in Panel A, a CFO can manage up earnings through increasing discretionary accruals (accruals $\uparrow$) or reducing discretionary expenditures (expenses $\downarrow$). We conjecture that the departing male CFOs are more aggressive than the departing female CFOs in manipulating up earnings prior to their departures. Therefore, our focus is on column (3) in Panel A. We hypothesize that the difference in EM between the departing male and female CFOs, ΔEM, is positive measured by DCAC and negative measured by abnormal discretionary expenditures.

H3a At $(t - 1)$, the male departing CFOs exhibit higher discretionary current accruals than the female departing CFOs, ceteris paribus.

H3b At $(t - 1)$, male departing CFOs exhibit lower abnormal discretionary expenditures than the female departing CFOs, ceteris paribus.

On the other hand, the succeeding CFOs manage down earnings at $(t + 1)$. As shown in Panel B of Table 1, a new CFO can manage down earnings through reducing discretionary accruals (accruals $\downarrow$) or increasing discretionary expenditures (expenses $\uparrow$). We conjecture that the new male CFOs are more aggressive than the new female CFOs in intentionally lowering earnings in their first year on the job. Therefore, our focus is on column (3) in Panel B. We hypothesize that the difference in EM between newly appointed male and female CFOs, ΔEM, is negative measured by DCAC and positive measured by abnormal discretionary expenditures.

H3c At $(t + 1)$, the newly appointed male CFOs exhibit lower discretionary current accruals than the newly appointed female CFOs, ceteris paribus.

H3d At $(t + 1)$, the newly appointed male CFOs exhibit higher abnormal discretionary expenditures than the newly appointed female CFOs, ceteris paribus.

Table 1 CFO gender and earnings management by departing and succeeding CFOs

Hypothesis	(1) Female	(2) Male	(3) $\Delta EM = (2) - (1)$
Panel A: departing CFOs at $(t-1)$[a]			
H3a: DCAC	accruals ↑	accruals ↑	ΔEM_{DCAC}: +
H3b: ABDXPN	expenses ↓	expenses ↓	ΔEM_{ABDXPN}: −
Panel B: succeeding CFOs at $(t+1)$[b]			
H3c: DCAC	accruals ↓	accruals ↓	ΔEM_{DCAC}: −
H3d: ABDXPN	expenses ↑	expenses ↑	ΔEM_{ABDXPN}: +

Panel A illustrates the hypothesized earnings management (EM) (H3a and H3b) by departing female and male CFOs at time $(t-1)$, while Panel B illustrates the hypothesized EM (H3c and H3d) by the succeeding female and male CFOs at time $(t+1)$. t is the CFO transition year. DCAC is the discretionary current accruals and ABDXPN is the abnormal discretionary expenditures

[a] We hypothesize that at time $(t-1)$, departing male CFOs are more aggressive than their female counterparts in managing up earnings (i.e. accruals ↑, and/or expenses ↓). Columns (1) and (2) present directions of EM by departing female and male CFOs, respectively. Column (3) presents the expected EM difference in magnitude and sign between the departing male and female CFOs

[b] We hypothesize that at time $(t+1)$, succeeding male CFOs are more aggressive than their female counterparts in managing down earnings (i.e. accruals ↓, and/or expenses ↑). Columns (1) and (2) present directions of EM by succeeding female and male CFOs, respectively. Column (3) presents the expected EM difference in magnitude and sign between the succeeding male and female CFOs

3 Data and sample

We obtain the financial data from the Chinese Securities Market and Accounting Research (CSMAR) databases. The characteristic data on top corporate officers, board of directors and ownership structures is from CSMAR's Corporate Governance Research database. We restrict our sample to all non-financial firms listed in the Shanghai Stock Exchange or the Shenzhen Stock Exchange for the period 1999–2011. We exclude firm-years with negative book equity or without the required data to calculate EM measures. Our final sample consists of 3,205 female CFO firm-years and 8,439 male CFO firm-years, with a total of 11,644 firm-year observations.[13]

Table 2 presents the numbers of female and male CFOs by year in Panel A and by industry in Panel B. The descriptive statistics in Panel A indicate that female CFO representation in China's corporate sector is remarkably high and stable, ranging from 26 to 30 % over the sample period. Panel B shows there is a wide variation in female CFO percentage across industries. Industry classifications are based on the CRSC two-digit classifications, similar to the two-digit SIC codes in the US. A minimum of 15 observations for each industry-year grouping is required. The retail industry has the highest female CFO representation at 42 %, while tourism and culture industry has the lowest female CFO representation at 16 %.

Table 3 presents summary statistics for the firm, ownership, and corporate governance characteristics used in this study. Appendix 2 provides a detailed description for these variables. Firm characteristic measures are winsorized at the bottom and the top one percentile. The mean and median of variables for female CFO firm-years and male CFO firm-years are presented in columns (1) and (2), respectively. Column (3) reports test

[13] There are 1,995 unique firms in the sample and 108 of them stay for the entire sample period.

Table 2 Descriptive statistics of CFO gender by year and by industry

Year	Female CFO		Male CFO		Total
	N	%	N	%	
Panel A presents CFO gender distribution by year					
1999	129	30	300	70	429
2000	164	28	418	72	582
2001	196	26	558	74	754
2002	228	27	623	73	851
2003	256	27	677	73	933
2004	261	26	729	74	990
2005	282	27	764	73	1046
2006	265	26	766	74	1,031
2007	194	26	566	75	760
2008	237	27	648	73	885
2009	273	29	672	71	945
2010	310	29	750	71	1,060
2011	410	30	968	70	1,378
Total	3,205	28	8,439	72	11,644

Industry	Female CFO		Male CFO		Total
	N	%	N	%	N
Panel B presents CFO gender distribution by industry					
Retail industry	287	42	392	58	679
Paper and allied products*	88	37	153	63	241
Chemical fiber and rubber products*	121	36	214	64	335
Pharmaceutical and biotech products manufacturing*	287	35	531	65	818
Transportation industry	139	32	301	68	440
Transportation and electrical equipment manufacturing*	290	29	710	71	1,000
Textile and garment industry*	119	28	310	72	429
Water and electric utilities	149	28	388	72	537
Agriculture and farming	67	27	184	73	251
Mining, oil and gas exploration	89	26	248	74	337
Consumer electronics*	122	26	342	74	464
General machinery and equipment manufacturing[a]	196	25	588	75	784
Computer and information technology	182	25	545	75	727
Real estate development	262	25	791	75	1,053
Petro refining and raw chemicals manufacturing[a]	212	24	662	76	874
Conglomerates	165	24	519	76	684
Food processing and beverage production[a]	131	23	444	77	575
Metal smelting, processing, and products[a]	213	22	736	78	949
Civil engineering and construction	46	21	171	79	217
Tourism and culture industry	40	16	210	84	250
Total	3,205	28	8,439	72	11,644

[a] indicates manufacturing industry

Table 3 Summary statistics and univariate tests of control variables

Variable	(1) Female CFO			(2) Male CFO			(3) Difference = (1) − (2)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Firm characteristics								
MVE	3,144	4,598.7	2,423.1	8,217	4,987.4	2,481.8	−388.7**	−58.7
SALES	3,205	2,126.4	866.0	8,439	2,771.7	901.6	−645.2***	−35.7
TA	3,205	3,372.7	1,598.9	8,439	4,022.2	1,641.5	−649.4***	−42.6
BM	3,205	0.410	0.348	8,439	0.415	0.354	−0.006	−0.006
GROWTH	3,205	0.189	0.116	8,439	0.192	0.115	−0.003	0.001
LEV	3,205	0.293	0.266	8,439	0.291	0.272	0.002	−0.006
CFFO	3,205	0.051	0.051	8,439	0.051	0.048	0.000	0.003*
ROS	3,205	0.054	0.064	8,439	0.045	0.060	0.009*	0.004**
ROA	3,205	0.033	0.037	8,439	0.031	0.034	0.002	0.003***
Ownership and governance								
STATE	3,205	0.222	0.1	8,439	0.242	0.15	−0.020***	−0.050***
INST	3,205	0.194	0.081	8,439	0.182	0.05	0.013***	0.031***
BSIZE	3,205	9.32	9	8,433	9.467	9	−0.150***	0***
i-DIRECTOR	3,205	2.74	3	8,433	2.772	3	−0.032	0
f-DIRECTOR	3,205	1.14	1	8,439	0.790	1	0.345***	0***
CFO_AGE	3,197	44.20	44	8,422	42.62	42	1.583***	2***
CFO_TENURE	3,045	2.85	2	8,172	2.94	2	−0.09	0
f-CEO	3,205	0.06	0	8,439	0.04	0	0.016***	0***

This table presents summary statistics and univariate tests of the control variables by CFO gender. Columns (1) and (2) present means and medians of the relevant variables for female CFO firm-years and male CFO firm-years, respectively. Column (3) presents univariate test results for mean and median differences of the variables between female CFO firm-years and male CFO firm-years. See Appendix 2 for variable definitions

***, **, * indicate significance levels at the 1, 5, and 10 %, respectively, based on the t-statistics for the mean difference and Z-statistics for the median difference tests

results on the mean and median differences of these variables. Several observations are noted. First, female CFOs are associated with firms that are smaller on average, as measured by market value of equity (MVE), sales, and total assets (TA). Second, firms with female CFOs tend to perform better based on return on sales (ROS) and return on assets (ROA) than firms with male CFOs do. Further, firms with female CFOs are associated with lower state ownership (STATE) and higher institutional ownership (INST), and tend to have smaller board (BSIZE) and more female directors on board (f-DIRECTOR). Lastly, female CFOs are about 2 years older than male CFOs on average. However, both female and male's tenures on the CFO position (CFO_TENURE) are about the same, which is 3 years on average.

4 Empirical results

4.1 Univariate comparison analysis: CFO gender and earnings management

Table 4 presents test results based on a simple cross-sectional comparison of the means and medians of EM measures between the female CFO firm-years and male CFO firm-years subsamples. The results in Panel A show that female CFO firm-years have significantly lower DCAC and lower total accruals (TAC) than male CFO firm-years do over the whole sample period. Specifically, column (3) shows that the means of DCAC and TAC for female CFO firm-years are 1.31 % (t-statistic = 3.10) and 0.61 % (t-statistic = 2.83) lower than those for male CFO firm-years, respectively. Based on median values, the DCAC and TAC for female CFO firm-years are 0.87 % (z-statistic = 1.97) and 0.42 % (z-statistic = 2.34) lower than those for male CFO firm-years do, respectively. These preliminary results support our first hypothesis (**H1**).

Panel A further shows that the mean and median differences of the two real EM measures between the female CFO and male CFO firm-year subsamples are significant with expected signs. Specifically, the female CFO firm-years have, on average, 1.21 % (t-statistic = 2.76) lower in abnormal production costs (ABCOST) and 0.45 % (t-statistic = 2.11) higher in abnormal discretionary expenses (ABDXPN) than the male CFO firm-years. The median differences in ABCOST and ABDXPN show a similar pattern, suggesting that female CFOs engage less in real activities-based EM. These preliminary results tend to support our second set of hypotheses (**H2**).

Over the years, Chinese regulators have made progress in mandating Chinese firms to report financial statements that are consistent with International Financial Reporting Standards (IFRS). On February 15, 2006, Chinese regulators announced the issuance of Accounting Standards for Business Enterprises (ASBEs) that are largely consistent with IFRS. The mandatory adoption of ASBEs for all publicly listed firms in China began in January 1, 2007. Since the IFRS are believed to promote information transparency and good corporate governance, we examine whether the adoption of the IFRS-consistent ASBEs affects the relation between CFO gender and EM in China. We do so by splitting the whole sample into two subsample periods: the pre-IFRS period (1999–2006) and the post-IFRS period (2007–2011).

Panel B of Table 4 presents test results on the four EM measures over 1999–2006 period and Panel C for the period of 2007–2011. The results in Panel B suggest that based on both mean and median values of all but abnormal discretionary expenses measure of EM, female CFOs engage in less earning management than their male counter parts in the pre-IFRS period (i.e. supporting **H1** and **H2**). The results in Panel C show a similar, though

Table 4 Mean and median of earnings management measures by CFO gender

	Symbol	(1) Female CFO		(2) Male CFO		(3) Difference = (1) − (2)	
		Mean	Median	Mean	Median	Mean (t-stat)	Median (Z-stat)
Panel A: 1999–2011							
Discretional current accruals	DCAC	−0.0089	−0.0020	0.0042	0.0067	−0.0131*** (−3.10)	−0.0087** (−1.97)
Total accruals	TAC	−0.0075	−0.0115	−0.0014	−0.0073	−0.0061*** (−2.83)	−0.0042** (−2.34)
Abnormal production costs	ABCOST	−0.0148	−0.0225	−0.0027	−0.0114	−0.0121*** (−2.76)	−0.0111*** (−2.88)
Abnormal discretionary expenses	ABDXPN	0.0170	0.0031	0.0125	0.0011	0.0045** (2.11)	0.0020** (2.09)
Panel B: 1999–2006							
Discretional current accruals	DCAC	−0.0088	−0.0019	0.0041	0.0086	−0.0129** (−2.43)	−0.0105* (−1.90)
Total accruals	TAC	−0.0179	−0.0197	-0.0132	−0.0154	−0.0047* (−1.93)	−0.0043** (−1.97)
Abnormal production costs	ABCOST	−0.0099	−0.0248	0.0015	−0.0115	−0.0114* (−1.90)	−0.0133*** (−3.10)
Abnormal discretionary expenses	ABDXPN	0.0105	0.0007	0.0076	0.0002	0.0029 (1.57)	0.0005 (0.34)
Panel C: 2007–2011							
Discretional current accruals	DCAC	−0.0092	−0.0025	0.0043	0.0020	−0.0135** (−1.95)	−0.0045 (−1.00)
Total accruals	TAC	0.0055	−0.0011	0.0144	0.0051	−0.0089** (−2.26)	−0.0062* (−1.81)
Abnormal production costs	ABCOST	−0.0214	−0.0196	−0.0088	−0.0101	-0.0126** (−2.00)	−0.0095 (−0.06)
Abnormal discretionary expenses	ABDXPN	0.0251	0.0069	0.0192	0.0011	0.0059 (1.34)	0.0058 (0.87)

This table presents the mean and median of the four EM measures: discretionary current accruals (DCAC), total accruals (TAC), abnormal production costs (ABCOST), and abnormal discretionary expenditures (ABDXPN). Columns (1) and (2) presents the EM measures for female CFO firm-years and male CFO firm-years, respectively. Column (3) presents the univariate test statistics for mean (t-stat) and median (Z-stat) differences between the female and male CFO firm-years. See Appendix 2 for variable definitions. Panel A presents the relevant statistics for the full sample period from 1999–2011, while Panels B and C for subsample periods 1999–2006 and 2007–2011, respectively. There are 3,205 female CFO firm-years and 8,439 male CFO firm-years over the whole sample period

***, **, * indicate significance levels at the 1, 5, and 10 %, respectively

weaker pattern (based on median values) for the post-IFRS adoption period. Overall, our results in Panels B and C of Table 4 do not show strong evidence that implementation of IFRS affects our findings over the whole sample period.[14]

4.2 Multivariate regression analysis

4.2.1 Regression method

We next perform a cross-sectional multivariate regression analysis to control for other factors that have shown to influence EM. The generic regression model is as follows:

$$EM = \beta_0 + \beta_1 F\_CFO + \sum \gamma_j X_j + \varepsilon \quad (1)$$

where EM is one of the four EM measures described earlier. F_CFO is a gender indicator that equals one if the CFO is female, and zero otherwise. X_j (j = 1, 2… k) is a set of k control variables discussed below. The regression Eq. (1) is estimated by ordinary least squares (OLS) method controlling both industry and year effects. If hypotheses **H1** and **H2a** are true, then coefficient of F_CFO, β_1, would be significantly negative. If **H2b** is true, β_1 would be significantly positive.

As in Gerger and North (2006) and Barua et al. (2010), the set of control variables includes firm size (log of market value of equity, LOGMVE), book-to-market ratio (BM), sales growth (GROWTH), leverage (LEV), cash flow from operations scaled by lagged assets (CFFO), and lagged return on sales (ROS_{t-1}). The existing empirical evidence in literature suggests that firm size, book-to-market ratio, leverage, and cash flow from operations be negatively and sales growth be positively related to accruals (Ashbaugh et al. 2003; Butler et al. 2004). The lagged ROS is included to control for prior performance.

We further control for ownership structure (STATE and INST) due to its uniqueness to the Chinese listed firms, where STATE represents the percentage of shares held by central and/or local government(s) and INST represents the percentage of shares held by non-state institutions. We control for corporate governance as well since good corporate governance has shown to reduce earnings manipulation. In particular, the fraction of independent directors on the board (i-DIRECTOR) and board size (BSIZE) are found to be negatively related to discretionary accruals (Klein 2002; Xie et al. 2003). While some researchers argue that a CEO serving as board chairman of the same firm (Duality) is a good corporate governance practice, others argue for precisely the opposite. We leave it as an empirical question. We also include CFO age (CFOAGE) and CFO tenure (CFO_TENURE) to proxy for experience since CFO financial expertise is shown to influence EM (Aier et al. 2005). CFO age is also used as a proxy for risk-aversion since a person tends to become more risk averse as she/he ages. Both CFO age and CFO tenure are human factors in addition to gender that may influence corporate decision making. Finally, we control for the fraction of female directors on the board (f-DIRECTOR) and gender of the CEO (f-CEO). If women are more risk averse hence making more conservative accounting decisions than their male counterparts, more women on the board or the CEO being a woman may also influence EM of their firms.

[14] Using data from 1998–2009 Wang and Campbell (2012) also find that implementation of IFRS does not reduce or increase earnings management in Chinese listed companies.

4.2.2 CFO gender and accruals-based earnings management

Table 5 presents the multivariate regression results for the accruals-based EM measures. The dependent variable is DCAC for regressions in columns (1) to (3). Column (1) employs independent variables similar to those in Geiger and North (2006), while column (2) additionally controls for ownership structure as well as corporate governance characteristics. The main variable of interest, the gender indicator F_CFO, has a negative coefficient that is significant at 1 % level in columns (1) and (2), suggesting that the female CFO firm-years have significantly lower DCAC than the male CFO firm-years do. The results in column (2) further show that both BSIZE and CFOAGE have a significantly negative coefficient, indicating that smaller boards and older CFOs may be able to monitor firm financial reporting more effectively, resulting in less opportunities for accruals manipulation. However, CFO tenure seems not to influence the accrual-based EM.

As a robustness check, column (3) of Table 5 presents regression results of a performance-matched subsample. As discussed in Dechow et al. (1995), Ashbaugh et al. (2003), and Kothari et al. (2005), the modified Jones' model may be mis-specified when applied to firms with significantly different performance, and performance matching is a convenient and reliable way to mitigate the potential problems related to misspecification. Though the past performance is controlled in our regression Eq. (1), we proceed to construct a performance-matched sample as a means of robustness check on our results. Following the procedure described in Kothari et al. (2005) we match each female CFO firm-year with one male CFO firm-year from the same industry that has the closest performance measured by ROS in that year. The performance-matched sample consists of 2,940 female CFO firm-years and 2,940 male CFO firm-years. As shown in column (3), the coefficient of F_CFO is significantly negative (-0.011 with p value $= 0.045$), consistent with the results in columns (1) and (2).

Regressions in columns (4) and (5) use total accruals (TAC) as an alternative measure for accruals-based EM. The coefficient of F_CFO in both columns is negative and significant at 1 % level, suggesting that female CFO firm-years have significantly lower total accruals than male CFO firm-years do. Overall, the results in Table 5 support our first hypothesis (**H1**) that female CFO firm-years exhibit lower discretionary accruals and lower total accruals than male CFO firm-years do.

4.2.3 CFO gender and real activities-based earnings management

Table 6 presents multivariate regression results for the real EM related hypotheses **H2a** and **H2b**. The dependent variable is abnormal production costs (ABCOST) in columns (1) to (3) and abnormal discretionary expenditures (ABDXPN) in columns (4) and (5). As in Roychowdhurry (2006) we include in the regression only firm size, book-to-market ratio, leverage and past performance to control for firm characteristics, along with ownership structure and board characteristic variables. Column (1) shows that the coefficient of gender indicator F_CFO is significantly negative (-0.011 with p value $= 0.009$), indicating that female CFOs engage less in overproduction as an EM strategy than male CFOs do. Column (4) shows that the coefficient of F_CFO is significantly positive (0.004 with p value $= 0.060$), suggesting that female CFOs engage less in income-increasing discretionary expenditures manipulation compared to male CFOs. These results are robust after controlling for ownership structure and corporate governance characteristics, as shown in columns (2) and (5) in Table 6.

Table 5 Multivariate regression results of CFO gender and accruals-based earnings management

	DCAC			TAC	
	(1)	(2)	(3)	(4)	(5)
F_CFO	**−0.014**	**−0.015**	**−0.011**	**−0.007**	**−0.010**
	(0.001)	**(0.002)**	**(0.045)**	**(0.000)**	**(0.000)**
LOGMVE	−0.042	−0.019	−0.017	0.041	0.044
	(0.000)	(0.002)	(0.035)	(0.000)	(0.000)
BM	−0.039	−0.030	−0.020	−0.018	−0.020
	(0.000)	(0.001)	(0.110)	(0.000)	(0.000)
GROWTH	0.023	0.017	0.008	0.030	0.032
	(0.000)	(0.004)	(0.336)	(0.000)	(0.000)
LEV	−0.213	−0.258	−0.240	−0.046	−0.052
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CFFO	−0.531	−0.520	−0.483	−0.688	−0.665
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROS(*t*-1)	0.127	0.107		0.087	0.083
	(0.000)	(0.000)		(0.000)	(0.000)
STATE		−0.046	−0.062		−0.026
		(0.000)	(0.000)		(0.000)
INST		0.006	0.008		−0.012
		(0.604)	(0.627)		(0.043)
BSIZE		−0.019	−0.012		−0.007
		(0.055)	(0.382)		(0.089)
i-DIRECTOR		0.063	0.062		0.034
		(0.001)	(0.021)		(0.000)
f-DIRECTOR		0.008	−0.025		0.025
		(0.721)	(0.381)		(0.008)
DUALITY		0.022	0.012		0.012
		(0.000)	(0.115)		(0.000)
CFO_AGE		−0.037	−0.038		0.003
		(0.004)	(0.036)		(0.543)
CFO_TENURE		0.000	−0.001		0.000
		(0.626)	(0.691)		(0.567)
f-CEO		0.023	0.024		−0.004
		(0.029)	(0.118)		(0.529)
INTERCEPT	0.517	0.455	0.438	−0.341	−0.376
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	11,332	10,417	5,880	11,332	10,417
Adj R^2	0.126	0.138	0.113	0.416	0.399

This table presents multivariate OLS regression results for the accruals-based earnings management measures. The dependent variable for columns (1) to (3) is discretionary current accruals (DCAC). Column (3) presents regression results of a performance-matched subsample where each female CFO firm-year is matched with a male CFO firm-year in the same industry that has the closest return on sales (ROS) in that year. The dependent variable for columns (4) and (5) is total accruals (TAC). See Appendix 2 for variable definitions. The White (1980) heteroscedastic consistent *p* values are in the parentheses

Column (3) provides a robustness check on results for hypothesis **H2a** by focusing on a sample of manufacturing firms. Roychowdhury (2006) argues that manufacturing firms afford more opportunities (i.e. price discounts, overproduction, etc.) for managers to

Table 6 Multivariate regression results of CFO gender and real earnings management

	ABCOST			ABDXPN	
	(1)	(2)	(3)	(4)	(5)
F_CFO	**−0.011**	**−0.012**	**−0.021**	**0.004**	**0.005**
	(0.009)	**(0.012)**	**(0.001)**	**(0.060)**	**(0.052)**
LOGMVE	−0.028	−0.025	−0.023	0.026	0.034
	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)
BM	−0.011	0.004	0.012	−0.008	−0.009
	(0.145)	(0.645)	(0.285)	(0.042)	(0.032)
LEV	0.037	0.073	0.092	−0.018	−0.020
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
ROS(*t*-1)	−0.052	−0.060	−0.066	−0.007	−0.003
	(0.000)	(0.000)	(0.000)	(0.121)	(0.590)
STATE		0.038	0.016		0.000
		(0.001)	(0.297)		(0.984)
INST		0.045	0.043		0.024
		(0.000)	(0.009)		(0.001)
BSIZE		−0.022	−0.043		0.012
		(0.047)	(0.010)		(0.047)
i-DIRECTOR		−0.012	−0.039		0.055
		(0.612)	(0.259)		(0.000)
f-DIRECTOR		0.005	−0.022		0.015
		(0.813)	(0.461)		(0.249)
DUALITY		−0.001	0.000		0.010
		(0.939)	(0.954)		(0.007)
CFO_AGE		−0.004	0.003		−0.004
		(0.792)	(0.883)		(0.596)
CFO_TENURE		−0.001	0.001		−0.006
		(0.490)	(0.537)		(0.321)
f-CEO		−0.009	−0.011		−0.007
		(0.380)	(0.486)		(0.208)
INTERCEPT	0.253	0.273	0.264	−0.219	−0.327
	(0.000)	(0.000)	(0.015)	(0.000)	(0.000)
N	10,327	9,726	6,032	11,332	10,417
Adj R^2	0.012	0.020	0.027	0.014	0.025

This table presents multivariate OLS regression results for real earnings management measures. The dependent variable is abnormal production costs (ABCOST) in columns (1) to (3) and abnormal discretionary expenditures (ABDXPN) in columns (4) and (5). Column (3) presents results for the manufacturing industry. See Table 2 (Panel B) for definition of manufacturing industry. See Appendix 2 for variable definitions. The White (1980) heteroscedastic consistent *p* values are in the parentheses

manage earnings. He finds that overproduction and sales manipulation is significantly more pronounced in manufacturing industries than in other industries. We examine if overproduction by firms with male CFOs is more pronounced than by firms with female CFOs in manufacturing industries, ceteris paribus. Consistent with findings from the full sample the finding in column (3) suggests the same EM pattern exists among firms in manufacturing industries. Specifically, we find that the coefficient of F_CFO is highly significant and negative, with a value of −0.021 (p value = 0.001). Overall, the results in Table 6 support our second set of hypotheses (**H2a** and **H2b**) that male CFOs engage more in real EM

activities through overproduction and discretionary expenditures manipulation than their female counterparts.

5 Earnings management surrounding CFO transitions

5.1 Univariate comparison of variable characteristics and earnings management

Our large sample over a long period of time affords us the opportunity to examine the EM surrounding CFO transitions. Table 7 reports characteristics of relevant variables for firms with CFO transitions. Panel A shows that 205 female CFOs and 611 male CFOs departed from the CFO positions during the sample period. The CFO turnover frequency is about 6.4 % (= 205/3,205) for female CFO firm-years subsample and 7.2 % (= 611/8,439) for male CFO firm-years subsample. It also shows there is no significant difference in firm characteristics except for the firm market equity (MVE) between firms with female CFOs and firms with male CFOs. Panel B shows that among the newly appointed CFOs, 215 are females and 601 are males. On average the newly hired female CFOs are one year older than the newly hired male CFOs. Firms with newly hired male CFOs have higher sales and sales growth, and are larger in terms of TA and market equity.

The univariate comparison on EM surrounding CFO transitions concerning the hypotheses H3a, H3b, H3c, and H3d are presented in Table 8. Panel A shows that at $(t-1)$, the year prior to the CFO transition, ΔEM by DCAC is 3.47 % of lagged book assets and significant at the 5 % level, while ΔEM by ABDXPN is -1.62 % of lagged book assets and significant at the 10 % level. This indicates that prior to leaving the CFO position male CFOs are significantly more aggressive than female CFOs in managing up earnings by increasing accruals and/or reducing discretionary expenditures. These findings are consistent with our hypotheses **H3a** and **H3b**.

Panel B shows that at time $(t+1)$, the first year after the CFO transition, ΔEM is -3.50 and 2.47 % of lagged book assets, measured by DCAC and by ABDXPN, respectively. Both changes are significant at the 5 % level. This indicates that during their first year on the job, male new CFOs are significantly more aggressive than female new CFOs in managing down earnings by intentionally lowering accruals and/or increasing discretionary expenditures. These findings are consistent with our hypotheses **H3c** and **H3d**.

5.2 Multivariate regression analysis

We further conduct multivariate regression to control for the relevant firm and governance characteristics. The results are presented in Table 9. Columns (1) and (2) present EM pattern by the departing CFOs at $(t-1)$ using DCAC and ABDXPN as dependent variable, respectively. Column (1) shows that the coefficient of female CFO indicator, F_CFO, is significantly negative (-0.043 with p value $= 0.021$). This result indicates that the departing male CFOs exhibit significantly higher discretionary accruals than the departing female CFOs, which is consistent with **H3a**. Column (2) shows that the coefficient of F_CFO is significantly positive (0.021 with p value $= 0.033$), indicating that the departing male CFOs exhibit significantly lower discretionary expenditures than the departing female CFOs, which is consistent with **H3b**. In summary, results in columns (1) and (2) show that the departing male CFOs are more aggressive than the departing female CFOs in managing *up* earnings at time $(t-1)$, the year prior to their departure.

Table 7 Summary statistics and univariate tests of control variables surrounding CFO turnover

	(1) Female			(2) Male			(3) Diff = (1) − (2)	
Variable	N	Mean	Median	N	Mean	Median	Mean	Median
Panel A: Firm and governance characteristics by departing CFOs at time ($t-1$)								
Firm characteristics								
MVE	205	4,241.1	2,133.3	611	4,895.3	2,390.6	−654.2***	−257.3***
SALES	205	2,565.7	779.1	611	2,576.5	845.1	−10.8	−66.1
TA	205	3,866.2	1,817.1	611	3,873.3	1,662.4	−7.1	154.7
BM	205	0.429	0.361	611	0.409	0.329	0.021	0.031
GROWTH	205	0.220	0.114	611	0.189	0.110	0.031	0.004
LEV	205	0.322	0.286	611	0.307	0.289	0.015	−0.003
CFFO	205	0.045	0.042	611	0.053	0.049	−0.008	−0.007
ROS	205	0.023	0.051	611	0.021	0.047	0.002	0.004
ROA	205	0.020	0.026	611	0.019	0.026	0.001	0.000
Ownership and governance								
STATE	205	0.212	0.108	611	0.236	0.110	−0.024***	−0.002
INST	205	0.199	0.112	611	0.187	0.066	0.012**	0.05***
BSIZE	205	9.184	9	611	9.340	9	−0.156***	0**
i-DIRECTORS	205	2.837	3	611	2.949	3	−0.112	0
f-DIRECTORS	205	0.934	1	611	0.881	1	0.053	0
CFO_AGE	205	42.3	41	611	40.6	40	1.70***	1**
CFO_TENURE	205	2.91	2	611	3.02	2	−0.11	0
f-CEO	205	0.062	0	611	0.036	0	0.026***	0***

	(1) Female			(2) Male			(3) Diff = (1) − (2)	
Variable	N	Mean	Median	N	Mean	Median	Mean	Median
Panel B: Firm and governance characteristics by succeeding CFOs at time ($t+1$)								
Firm characteristics								
MVE	215	4,358.1	2,406.6	601	4,866.0	2,302.0	−507.9***	104.6
SALES	215	2,103.6	897.5	601	2,741.1	804.2	−637.5***	93.4
TA	215	3,340.8	1,790.6	601	4,060.3	1,656.2	−719.5***	134.4
BM	215	0.414	0.344	601	0.414	0.332	0.000	0.011
GROWTH	215	0.171	0.098	601	0.206	0.117	−0.035***	−0.019***
LEV	215	0.352	0.313	601	0.297	0.279	0.055***	0.034***
CFFO	215	0.054	0.051	601	0.049	0.046	0.004	0.005
ROS	215	0.035	0.051	601	0.016	0.047	0.018*	0.004
ROA	215	0.023	0.026	601	0.020	0.026	0.003	0.000
Ownership and governance								
STATE	215	0.228	0.090	601	0.231	0.112	−0.003	−0.022
INST	215	0.158	0.027	601	0.202	0.090	−0.044**	−0.063**
BSIZE	215	9.33	9	601	9.39	9	−0.06	0
i-DIRECTORS	215	3.06	3	601	2.87	3	0.19**	0
f-DIRECTORS	215	1.00	1	601	0.86	1	0.14**	0
CFO_AGE	215	40.6	40	601	39.2	39	1.40***	1**

Table 7 continued

	(1) Female			(2) Male			(3) Diff = (1) − (2)	
Variable	N	Mean	Median	N	Mean	Median	Mean	Median
f-CEO	215	0.049	0	601	0.040	0	0.009	0

This table presents summary statistics and univariate test results of the control variables surrounding CFO turnover. Panel A presents the statistics by departing CFOs in year ($t - 1$), while Panel B presents the statistics by succeeding CFOs in year ($t + 1$), where t is the year of CFO transition. Columns (1) and (2) are for firms with female CFOs and firms with male CFOs, respectively. Column (3) presents the mean and median differences in control variables between firms with female CFOs and firms with male CFOs. See Appendix 2 for variable definitions

***, **, * indicate significance levels at the 1, 5, and 10 %, respectively, based on the t-statistics for the mean difference and Z-statistics for the median difference tests

Table 8 Earnings management by departing and succeeding CFOs

Hypothesis	(1) Female N = 205	(2) Male N = 611	(3) Difference ΔEM = (2)−(1)
Panel A EM by departing CFOs at year *(t − 1)*			
H3a: DCAC	−0.0108	0.0239	0.0347** (2.02)
H3b: ABDXPN	0.0180	0.0018	−0.0162* (−1.74)
	(1) Female N = 205	(2) Male N = 611	(3) Difference ΔEM = (2) − (1)
Panel B EM by succeeding CFOs at year *(t + 1)*			
H3a: DCAC	−0.0031	−0.0381	−0.0350** (−1.97)
H3b: ABDXPN	0.0050	0.0297	0.0247* (2.33)

Panel A presents earnings management (EM) by departing CFOs in year ($t - 1$), while Panel B presents EM by incomings CFOs in year ($t + 1$), where *t* is the year of CFO transition. DCAC is the discretionary current accruals and ABDXPN is the abnormal discretionary expenditures. In Panel A, columns (1) and (2) present EM by departing female and male CFOs in year ($t - 1$), respectively. In Panel B, columns (1) and (2) present EM by newly appointed female and male CFOs in year ($t + 1$), respectively. Column (3) in both panels presents the mean EM differences between male and female CFOs. The t-test statistics are in the parentheses

***, **, * indicate significance levels at the 1, 5, and 10 %, respectively

Columns (3) and (4) present EM pattern by the succeeding CFOs at ($t + 1$) using DCAC and ABDXPN as dependent variable, respectively. The coefficient of female CFO indicator, F_CFO, is significant at the 5 % level in both columns with the expected sign. Specifically, column (3) shows that the newly appointed male CFOs exhibit significantly lower discretionary accruals than the newly appointed female CFOs, consistent with **H3c**. Column (4) shows that the newly appointed male CFOs exhibit significantly higher discretionary expenditures than the newly appointed female CFOs, consistent with **H3d**. In summary, results in columns (3) and (4) show that the newly appointed male CFOs are more aggressive than the newly appointed female CFOs in managing *down* earnings at time ($t + 1$), the year following their appointment.

Table 9 Regression results of earnings management by departing and succeeding CFOs

	Year = $t-1$		Year = $t+1$	
	(1) DCAC	(2) ABDXPN	(3) DCAC	(4) ABDXPN
F_CFO	**−0.043**	**0.021**	**0.039**	**−0.025**
	(0.021)	**(0.033)**	**(0.024)**	**(0.022)**
LOGMVE	−0.069	0.043	−0.047	0.064
	(0.000)	(0.000)	(0.014)	(0.000)
BM	−0.027	0.024	−0.027	0.032
	(0.358)	(0.173)	(0.394)	(0.097)
GROWTH	0.022		0.016	
	(0.212)		(0.332)	
LEV	−0.171	−0.054	−0.197	−0.007
	(0.000)	(0.013)	(0.000)	(0.716)
CFFO	−0.234		−0.588	
	(0.009)		(0.000)	
ROS(t-1)	0.061	−0.034	0.044	−0.023
	(0.145)	(0.089)	(0.175)	(0.253)
STATE	−0.088	−0.014	0.029	0.003
	(0.019)	(0.507)	(0.440)	(0.878)
INST	−0.067	−0.007	−0.002	0.078
	(0.135)	(0.783)	(0.953)	(0.002)
BSIZE	0.016	0.002	−0.004	−0.005
	(0.666)	(0.930)	(0.909)	(0.811)
i-DIRECTOR	0.059	0.059	0.051	−0.014
	(0.404)	(0.195)	(0.503)	(0.764)
f-DIRECTOR	−0.113	0.054	−0.015	0.034
	(0.121)	(0.195)	(0.848)	(0.468)
DUALITY	0.016	0.005	0.001	0.017
	(0.455)	(0.703)	(0.967)	(0.249)
CFO_AGE	−0.031	0.002	−0.056	−0.034
	(0.554)	(0.951)	(0.275)	(0.284)
CFO_TENURE	0.009	−0.008		
	(0.550)	(0.342)		
f-CEO	0.082	−0.022	0.111	0.003
	(0.060)	(0.281)	(0.004)	(0.896)
INTERCEPT	0.822	−0.411	0.716	−0.463
	(0.002)	(0.007)	(0.000)	(0.003)
N	816	816	816	816
Adj R^2	0.078	0.044	0.119	0.059

Columns (1) and (2) present earnings management (EM) by the departing CFOs in year ($t-1$), while columns (3) and (4) present EM by the newly appointed CFOs in year ($t+1$). The dependent variables are discretionary current accruals (DCAC) in columns (1) and (3) and abnormal discretionary expenditures (ABDXPN) in columns (2) and (4). The White (1980) heteroscedastic consistent p values are in the parentheses. See Appendix 2 for variable definitions

6 Conclusion

In this study, we examine the relation between CFO gender and the accruals-based and real activities-based EM in China's listed firms from 1999-2011. We first conduct a cross-sectional univariate comparison and multivariate regression analyses. Our results show that female CFO firm-years exhibit significantly lower discretionary current accruals, lower total accruals, lower abnormal production costs, and higher abnormal discretionary expenses than male CFO firm-years do. Our results are consistent and robust for both the pre- and post-IFRS subperiods, suggesting that the adoption of IFRS consistent accounting standards in China seems to have little impact on the relation between CFO gender and EM.

We also examine the relation between CFO gender and EM surrounding CFO transitions. We find that the departing male CFOs are more aggressive than the departing female CFOs in managing *up* earnings during their last year with the firm, possibly in an attempt to save their jobs or to obtain bigger severance or retirement packages. The results also show that the newly appointed male CFOs are more aggressive than the newly appointed female CFOs in managing *down* earnings during their first year on the job, possibly in an attempt to take bigger credit for any subsequent performance improvements.

Our study contributes to the existing literature by providing the first empirical evidence on CFO gender and EM in listed firms in China, the largest developing country in the world. The ongoing accounting scandals and the ensuring SEC investigations of Chinese firms publicly traded in US stock exchanges make our study particularly timely.

Acknowledgments We thank Elizabeth Devos, Markus Schmid, Dechun Wang, Sabine Wende, and participants at the 2010 European FMA conference, the 2011 FMA annual meeting, the 2013 EFA annual meeting, and brown bag seminar at University of Texas at El Paso for helpful comments. We thank the College of Business Administration at the University of Texas at El Paso for financial supports.

Appendix 1: Earnings management measures

Accruals-based measures

We employ DCAC as our primary accruals-based measure for earnings management. We estimate the following modified Jones model as in Dechow et al. (1995) to obtain the discretionary current accruals:

$$\frac{CAC_{i,t}}{TA_{i,t-1}} = \frac{\alpha_1}{TA_{i,t-1}} + \beta_{1,i}\frac{(\Delta S_{i,t} - \Delta REC_{i,t})}{TA_{i,t-1}} + \varepsilon_i \quad (2)$$

where *CAC* is current accruals, measured as the change in non-cash current assets less the change in current liabilities excluding the change in short-term debt. *TA* is total book assets. *ΔREC* is the change in accounts receivable. *ΔS* is the change in sales between current year and the year before.

The parameters in model (2) are estimated each year cross-sectionally by industry. The estimated coefficients are then used to calculate the normal or predicted current accruals. The DCAC is the difference between the actual current accruals (CAC) scaled by lagged TA and the predicted current accruals.

We also use total accruals (TAC) as an alternative measure, which is the difference between operating income before taxes and cash flows from operating activities, scaled by lagged TA.

Real activities-based measures

We follow Roychowdhurry (2006) and use abnormal production costs and abnormal discretionary expenditures as our real activities-based earning management measures, modeled in Eqs. (3) and (4) below, respectively:

$$\frac{PCOST_{i,t}}{TA_{i,t-1}} = \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1\left(\frac{S_{i,t}}{TA_{i,t-1}}\right) + \beta_2\left(\frac{\Delta S_{i,t}}{TA_{i,t-1}}\right) + \beta_3\left(\frac{\Delta S_{i,t-1}}{TA_{i,t-1}}\right) + \varepsilon_i \quad (3)$$

$$\frac{DXPN_{i,t}}{TA_{i,t-1}} = \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta\left(\frac{S_{i,t-1}}{TA_{i,t-1}}\right) + \varepsilon_i \quad (4)$$

where *PCOST* is production cost, defined as costs of goods sold (COGS) plus change in inventory. *DXPN* is discretionary expenditures, defined as the sum of research and development (R&D) and selling, general and administrative (SG&A) expenses.

Models (3) and (4) are also estimated each year cross-sectionally by industry. The estimated coefficients are then used to calculate the normal production cost and normal discretionary expenditures. The abnormal production costs (ABCOST) are the difference between the actual production costs scaled by lagged TA and the normal production costs estimated in model (3). The abnormal discretionary expenditures (ABDXPN) are the difference between the actual discretional expenditures scaled by lagged TA and the normal discretionary expenditures estimated in model (4).

Appendix 2

See Table 10

Table 10 Variable definitions

Variable	Symbol	Definition
Market value of equity	MVE	Year-end total number of common shares outstanding times year-end stock price per share
Sales	SALES	Sales revenues during the year
Total assets	TA	Year-end total book assets
Book-to-market ratio	BM	Book equity divided by market value of equity
Book leverage	LEV	Total book debt divided by total book assets
Return on sales	ROS	Net income after tax divided by sales
Return on assets	ROA	Net income after tax divided by total book assets
Sales growth	GROWTH	Sales growth over the previous year
Cash flow from operations	CFFO	Cash flow from operating activities, cash flow statement item, scaled by lagged total assets
State ownership	STATE	Total number of shares owned by the state divided by total number of shares outstanding
Institutional ownership	INST	Total number of shares owned by non-state institutions divided by total number of shares outstanding
Board size	BSIZE	Number of directors on the board
Independent directors	i-DIRECTOR	Number of non-executive directors divided by board size

Table 10 continued

Variable	Symbol	Definition
Female director	f-DIRECTOR	Number of female directors on the board
Female CEO dummy	f-CEO	Equal to one if the CEO is female, and zero otherwise
CFO age	CFO_AGE	Logarithm of CFO age
CFO tenure	CFO_TENURE	Logarithm of CFO tenure, defined as the number of years a CFO on the job at year end.
Duality	DUALITY	Dummy variable. Equal to one if CEO and chairman of the board are the same person, zero otherwise
Total accruals	TAC	The difference between operating income before taxes and cash flow from operating activities, scaled by lagged total assets
Current accruals	CAC	Noncash current assets minus current liabilities excluding the current portion of long-term debt
Discretionary current accruals	DCAC	Deviation from the predicted current accruals as estimated by model (2)
Production costs	PCOST	Equals costs of goods sold (COGS) plus change in inventory
Discretionary expenditures	DXPN	R&D plus SG&A expenses
Abnormal production costs	ABCOST	Deviations from the predicted production costs as estimated by model (3)
Abnormal discretionary expenditures	ABDXPN	Deviations from the predicted discretionary expenditures as estimated by model (4)

References

Adams RB, Ferreira D (2009) Women in the boardroom and their impact on governance and performance. J Financ Econ 94:291–309

Aharony J, Lee C, Wong T (2000) Financial packaging of IPO firms in China. J Account Res 38:103–126

Ahmed AS, Duellman S (2007) Accounting conservatism and board of director characteristics: an empirical analysis. J Account Econ 43:411–437

Ahmed AS, Billings BK, Morton RM, Stanford-Harris M (2002) The role of accounting conservatism in mitigating bondholder-shareholder conflicts over dividend policy and in reducing debt costs. Account Rev 77:867–890

Aier J, Comprix J, Gunlock M, Lee D (2005) The financial expertise of CFOs and accounting restatements. Account Horiz 19:123–135

Allen F, Qian J, Qian M (2005) Law, finance, and economic growth in China. J Financ Econ 77:57–116

Arch E (1993) Risk-taking: a motivational basis for sex differences. Psychol Rep 73(3):6–11

Ashbaugh H, LaFond R, Mayhew BW (2003) Do nonaudit services compromise auditor independence? Further evidence. Account Rev 78:611–640

Bajtelsmit V, van Derhei J (1997) Risk aversion and pension investment choices. In: Gordon MS (ed) Positioning Pensions for the twenty-first century. University of Pennsylvania Press, Philadelphia, pp 45–66

Barber B, Odean T (2001) Boys will be boys: gender, overconfidence, and common stock investment. Q J Econ 116:261–292

Barua A, Davision LF, Rama DV, Thiruvadi S (2010) CFO gender and accruals quality. Account Horiz 24:25–39

Basu S (1997) The conservatism principle and the asymmetric timeliness of earnings. J Account Econ 24:3–37

Butler M, Leone AJ, Willenborg M (2004) An empirical analysis of auditor reporting and its association with abnormal accruals. J Account Econ 37:139–165

Byrnes J, Miller DC, Schafer WD (1999) Gender differences in risk taking: a meta-analysis. Psychol Bull 125:367–383

Cesarini D, Johannesson M, Lichtenstein P, Sandewall Ö, Wallace B (2010) Genetic variation in financial decision-making. J Financ 65:1725–1754
Chen KCW, Yuan H (2004) Earnings management and capital resource allocation: evidence from China's accounting-based regulation of rights issues. Account Rev 79:645–665
Cheng LTW, Leung TY (2012) The effects of management demography on auditor choice and earnings quality: evidence from China. Rev Pac Basin Financ Mark Policy 15(2). doi:10.1142/S0219091511500093
Dechow P, Sloan R, Sweeney A (1995) Detecting earnings management. Account Rev 70:193–225
Eng LL, Lin LYC (2012) Accounting quality, earnings management and cross-listings: evidence from China. Rev Pac Basin Financ Mark Polic 15(2). doi:10.1142/S0219091512500099
Feng M, Ge W, Luo S, Shevlin T (2010) Why do CFOs become involved in material accounting manipulations? J Account Econ 51(1–2):21–36
Fields JT, Lyz T, Vincent L (2001) Empirical research on accounting choices. J Account Econ 31(1–3):255–308
Francis B, Hasan I, Park JC, Wu Q (2014) Gender difference in financial reporting decision-making: evidence from accounting conservatism. Contemp Account Res. doi:10.1111/1911-3846.12098
Ge W, Matsumoto D, Zhang JL (2011) Do CFOs have style? An empirical investigation of the effect of individual CFOs on accounting practices. Contemp Account Res 28:1141–1179
Geiger M, North D (2006) Does hiring a new CFO change things? An investigation of changes in discretionary accruals. Account Rev 81:781–809
Graham J, Harvey CR, Rajgopal S (2005) The economic implications of corporate financial reporting. J Account Econ 40(1–3):3–73
Gunny K (2009) The relation between earnings management using real activities manipulation and future performance: evidence from meeting earnings benchmarks. Contemp Account Res 27(3):855–888
Healy PM, Wahlen JM (1999) A review of the earnings management literature and its implications for standard setting. Account Horiz 13:365–383
Hinz RP, McCarthy DO, Turner JA (1997) Are women conservative investors? Gender differences in participant-directed pension investments. University of Pennsylvania Press, Philadelphia, pp 91–103
Huang J, Kisgen D (2013) Gender and corporate finance: are male executives overconfident relative to female executive? J Financ Econ 108:822–839
Jiang J, Petroni K, Wang I (2010) CFOs and CEOs: who have the most influence on earnings management? J Financ Econ 96:513–526
Jones J (1991) Earnings management during import relief investigations. J Account Res 29(2):193–228
Klein A (2002) Audit committee, board of director characteristics, and earnings management. J Account Econ 29:85–113
Kothari S (2001) Capital markets research in accounting. J Account Econ 31:105–231
Kothari S, Leone A, Wasley C (2005) Performance matched discretionary accruals. J Account Econ 39:163–197
Leuz C, Nanda D, Wysocki PD (2003) Earnings management and investor protection: an international comparison. J Financ Econ 69:505–527
Li IC, Hung JH (2013) The moderating effects of family control on the relation between managerial overconfidence and earnings management. Rev Pac Basin Financ Mark Polic 16(2). doi:10.1142/S0219091513500100
Liu Y, Wei Z, Xie F (2014) Do women directors improve firm performance in China? J Corp Financ 28:169–184
Mian S (2001) On the choice and replacement of chief financial officers. J Financ Econ 60:143–175
Qi BL, Yang R, Tian GL (2014) Can media deter management from manipulating earnings? Evidence from China. Rev Qunat Financ Acc 42(3):571–597
Roychowdhury S (2006) Earnings management through real activities manipulations. J Account Econ 42:335–370
Shen Z, Coakley J, Instefjord N (2014) Earnings management and IPO anomalies in China. Rev Quant Financ Account 42(1):69–93
Sunden A, Surette B (1998) Gender differences in the allocation of assets in retirement savings plans. Am Econ Rev 88:207–211
Wang Y, Campbell M (2012) Earnings management comparison: IFRS vs China GAAP. Int Manag Rev 8:5–11
Watts RL (2003a) Conservatism in accounting part I: explanations and implications. Account Horiz 17:207–221
Watts RL (2003b) Conservatism in accounting part II: evidence and research opportunities. Account Horiz 17:287–301

White H (1980) A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica 48:817–838
Xie B, Davidson WN III, DaDalt PJ (2003) Earnings management and corporate governance: the role of the board and audit committee. J Corp Financ 9:295–316
Yu Q, Du B, Sun Q (2006) Earnings management at rights issues thresholds: evidence from China. J Bank Financ 30:3453–3468
Zang AY (2011) Evidence on the tradeoff between real manipulation and accrual manipulation. Account Rev 87(2):675–703